COGNEX®

DataMan® 300 Series

Quick Reference Guide

DataMan
ID Readers

About DataMan 300 Series Readers

DataMan 300 series readers are high-performance, fixed-mount ID readers that among others offer the following advanced features:

- Highest Read Rates on 1-D and 2-D codes
- Most flexible optics and lighting
- Intelligent tuning and express setup

DataMan 300 series readers provide advanced Ethernet connectivity, support for serial RS-232 and discrete I/O, as well as advanced options for lighting and optics.

DataMan 300 series readers are packaged in a rugged, IP65-rated housing, and they provide numerous ease-of-use features, including one button to trigger and one to start tuning.

For More Information...

This document provides basic information about how to configure and use DataMan 300 series readers. Additional information is available through the Windows **Start** menu after you install the DataMan software on your PC:

DataMan Communications & Programming Guide shows how to integrate your DataMan reader with your automation software and factory network.

Cognex->DataMan Setup Tool v x.x->Documentation->Communications & Programming

DataMan Reader Configuration Codes provides printable 2-D codes that you can use to configure the DataMan reader.

Cognex->DataMan Setup Tool v x.x->Documentation->Reader Configuration Codes

DataMan Fixed Mount Readers Reference is a complete online hardware reference for the DataMan 300 and 500.

Cognex->DataMan Setup Tool v x.x->Documentation->Reference Manual

DataMan Questions and Answers provides context-sensitive information. You can view this help inside the Setup Tool or as a stand-alone help file.

Cognex->DataMan Setup Tool v x.x->Documentation->DM300->Questions and Answers

Release Notes list detailed system requirements and additional information about this DataMan software release.

Cognex->DataMan Setup Tool v x.x->Documentation->DataMan v x.y.z Release Notes

DataMan 300 Series Accessories

	CD-ROM (Setup Tool and Drivers) (206-6400-440)	Quick Reference Guide (this document) (590-7136)	Polarized lens cover with red LED illumination (DM300-PLCOV-RE)	C-Mount cover for C-Mount lenses (DM300-CCOV)
	Connection cable 24V, I/O, RS-232 (CCB-M12x12Fy-xx) (y straight/angled, xx specifies length)	Ethernet M12 to RJ45 cable (CCB-84901-y00x-xx) (y straight/angled, x-xx specifies length)	External light cable (CCB-M12x4MS-xxx) (xxx specifies length)	Ring light (CLRR-R7030G1CLR)
	24V power supply (IA00-PS24)	24V power supply (ACC-24I)	Coaxial light (CLRO-K5050G1)	Dark-field light (CLRD-D120G1)
	Liquid lens module and pre-focused 10.3 mm M12 lens (DM300-LENS-10LL)	24V power supply (CPS-xx-00) (xx specifies country)	Spot light (CLRS-P14G1)	Back light (CLRB-F100100G1)
	10.3 mm M12 lens with lockring (DM300-LENS-10)	16 mm M12 lens with locking (DM300-LENS-16)	Universal Mounting Bracket (DM100-UBRK-000)	Pivot Mounting Bracket (DM100-PIVOTM-00)
	Clear lens cover (DM300-CLCOV)	Diffuse lens cover with red LED illumination (DM300-DLCOV-RE)	External light mounting brackets (DM300-ELMB-xx) (xx specifies light type)	

DataMan 300 Systems

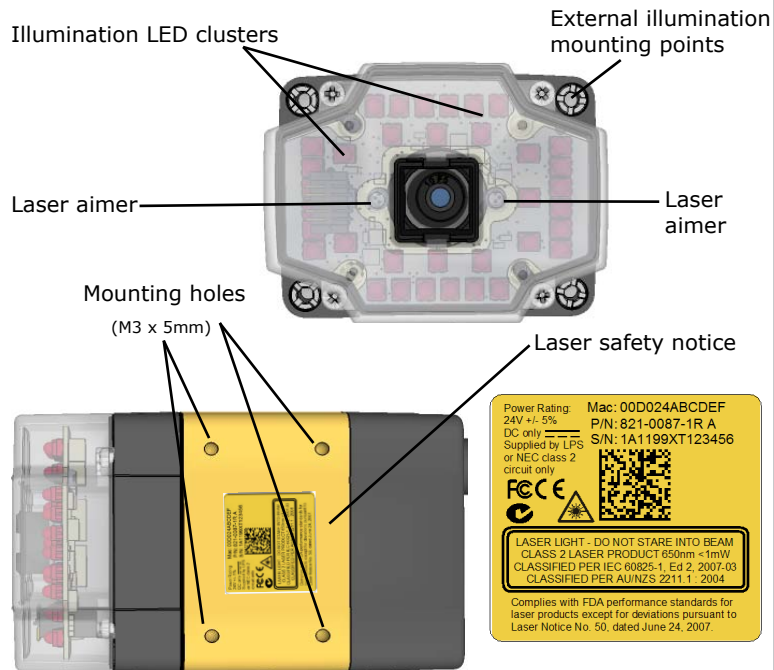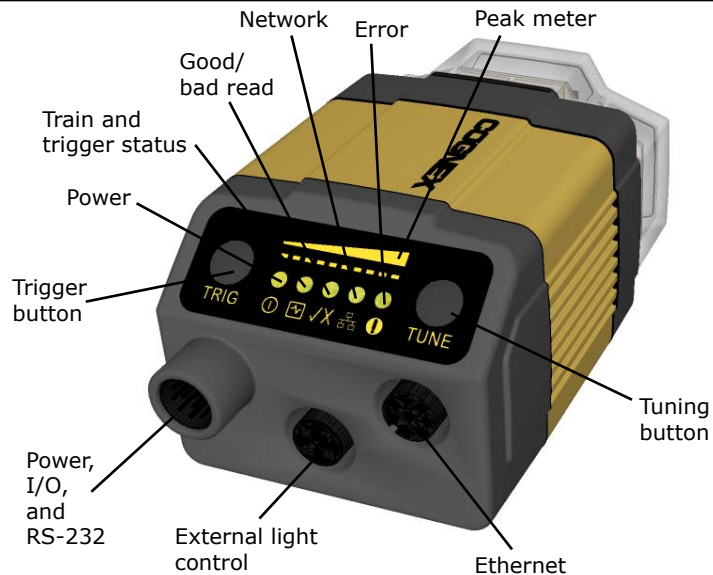|	Omni-directional 1-D Code Reading	1DMax+™ — Best-In-Class 1-D Reading	IDQuick™ — High-Speed 2-D Reading	2DMax+™ — for hard to read DPM and damaged 2-D codes	Resolution
DataMan 300L (DMR-300L-00)		√			800x600
DataMan 300X (DMR-300X-00)	√	√	√	√	800x600
DataMan 302L (DMR-302L-00)		√			1280x1024
DataMan 302X (DMR-302X-00)	√	√	√	√	1280x1024

Reader Layout

The following image shows the built-in lighting system of the DataMan 300 series reader, underneath the plastic lighting cover.

Illumination LED clusters

External illumination mounting points

Laser aimer

Laser aimer

Mounting holes

(M3 x 5mm)

Laser safety notice

Power Rating:
24V +/- 5%
DC only
Supplied by LPS
or NEC class 2
circuit only

Mac: 00D024ABCDEF
P/N: 821-0087-1R A
S/N: 1A1199XT123456

LASER LIGHT - DO NOT STARE INTO BEAM
CLASS 2 LASER PRODUCT 650nm <1mW
CLASSIFIED PER IEC 60825-1, Ed 2, 2007-03
CLASSIFIED PER AU/NZS 2211.1 : 2004

Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.

Reader Layout (Continued)

- Power: GREEN = Power ON
- Signal: GREEN = trained / YELLOW = untrained / BLINK OFF = trigger detected
- Good/bad read: GREEN = good read / RED = bad read
- Network: YELLOW = link up / BLINK = activity
- Error: RED = error
- Peak meter: decode yield, train/tune progress/quality

Installing the Lens

DataMan 300 series readers ship with no lens installed. You must install either a 10.3 mm lens with or without a variable-focus liquid lens module, a 16 mm lens, or a C-Mount lens or other S-Mount (M12) lenses.
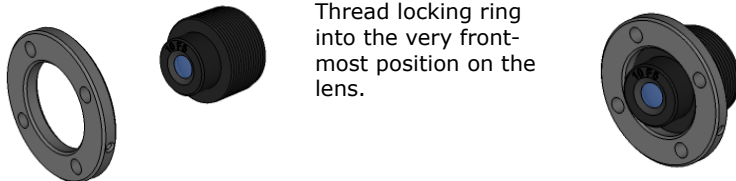
> ⚠ WARNING: Make sure your reader is unpowered before installing the lens.

Installing 10.3 mm lens with Manual Focus
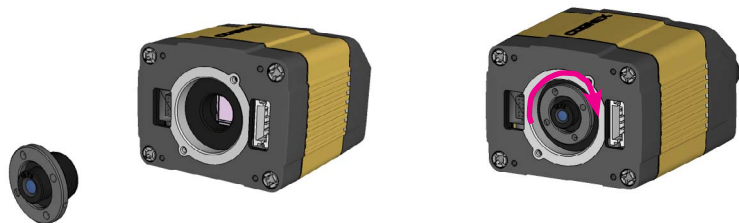
1 Remove lens plug.

2 Thread locking ring onto 10.3 mm lens barrel.

Thread locking ring into the very front-most position on the lens.

Installing the Lens (Continued)

3 Thread the lens into the reader.

4 Place the reader at the desired working distance from focus target.

1. Connect the reader to the Setup Tool.

2. On the Results Display pane, check the Focus Feedback option and enable Live Display. For best results, adjust your camera settings to make sure you have a brightened and high contrast image.

3. Use the *DataMan Focus Target* template, available through the Windows Start menu, to align the edge of the reader body to the line marked with the target distance used in your application.

4. Adjust focus for maximum sharpness. Enhance image quality in the Setup Tool for better guidance.
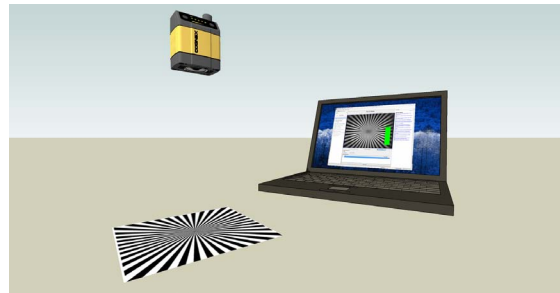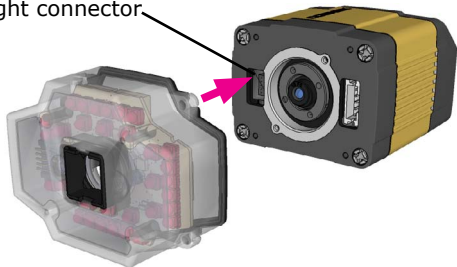

5 Tighten the locking ring.
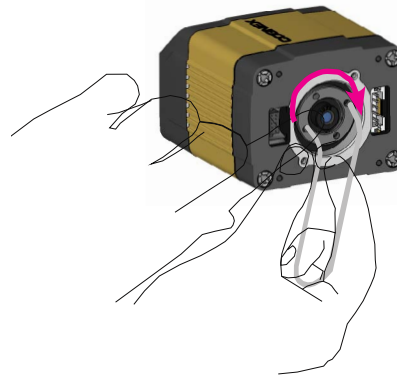
While carefully using a finger tip to keep the 10.3 mm lens barrel from rotating, use the supplied wrench to tighten the locking ring against the reader face.

After fixing the locking ring, verify focus position again, using the steps above.
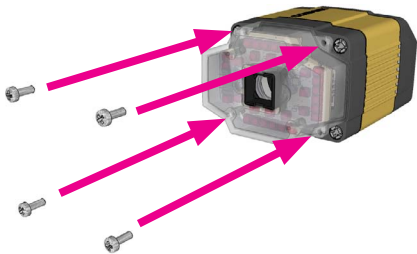
Installing the Lens (Continued)
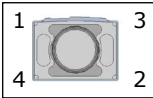
6 Attach front cover.

Light connector

7 Insert and tighten screws.

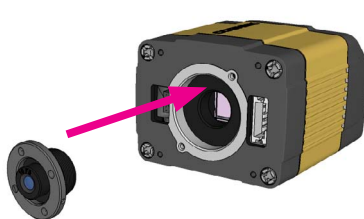⚠️ Tighten in sequence. Torque limit: 9 N-cm (0.8 Lb-In).

```
1       3

4       2
```

Installing a 10.3 mm lens with Liquid Lens
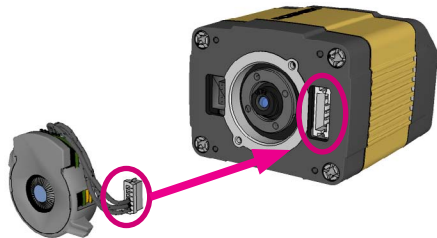
1 Remove lens plug.

2 Thread the lens into the reader.
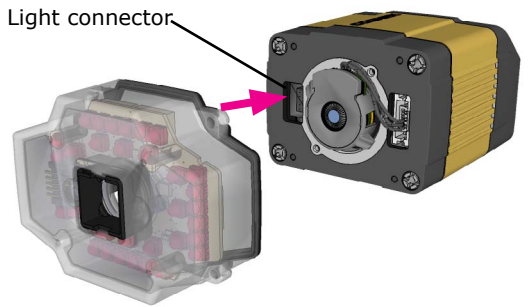
Installing the Lens (Continued)

4 Connect the liquid lens cable to the reader.
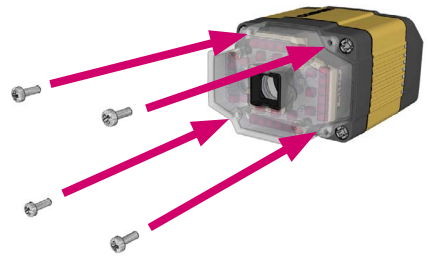

5 Snap the liquid lens module onto the nose of the lens, making sure that it lies flat.
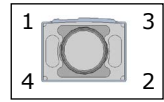

6 Attach front cover.

Light connector

7 Insert and tighten screws.

⚠️ Tighten in sequence. Torque limit: 9 N-cm (0.8 Lb-In).

Installing the Lens (Continued)

Installing a 16 mm Super High Density (SHD) lens

1 Remove lens plug.

2 Thread the lens into the reader.

3 Place the reader at the desired working distance from focus target.

1. Connect the reader to the Setup Tool.

2. On the Results Display pane, check the Focus Feedback option and enable Live Display.

3. Use the *DataMan Focus Target* template, available through the Windows Start menu, to align the edge of the reader body to the line marked with the target distance used in your application.

4. Adjust focus for maximum sharpness. Enhance image quality in the Setup Tool for better guidance.

Installing the Lens (Continued)

5 Press the rubber lens-locking cone into the reader.

While carefully avoiding rotating the lens, press the rubber lens-locking cone into the reader until it snaps into place inside the C-mount threads and around the nose of the 16 mm lens.

7 Attach front cover.

Light connector

8 Insert and tighten screws.

⚠️ Tighten in sequence. Torque limit: 9 N-cm (0.8 Lb-In).

1		3
4		2
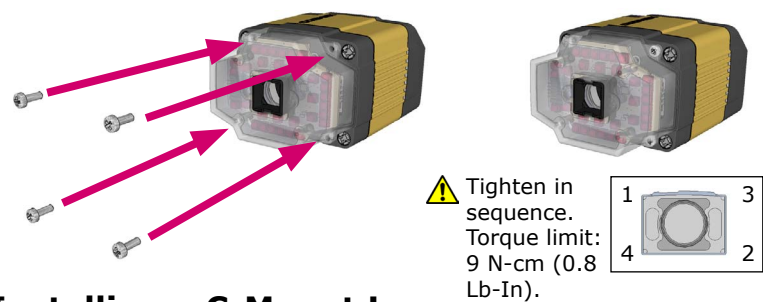
Installing a C-Mount Lens

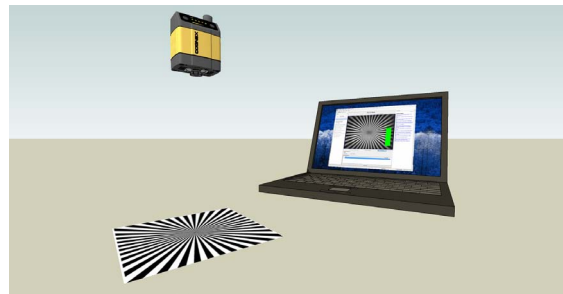**1** Remove lens plug.

Installing the Lens (Continued)
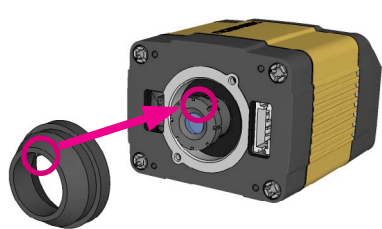
2 Thread the lens into the reader.
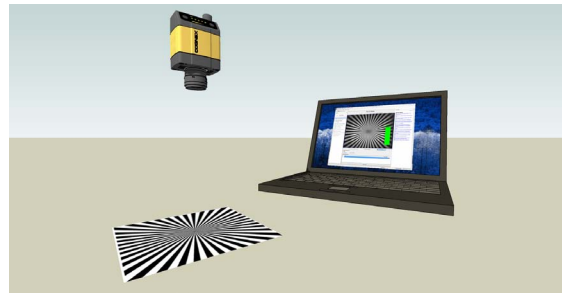
3 Place the reader at the desired working distance from focus target.

1. Connect the reader to the Setup Tool.

2. On the Results Display pane, check the Focus Feedback option and enable Live Display.

3. Use the *DataMan Focus Target* template, available through the Windows Start menu, to align the edge of the reader body to the line marked with the target distance used in your application.

4. Adjust focus for maximum sharpness. Enhance image quality in the Setup Tool for better guidance.
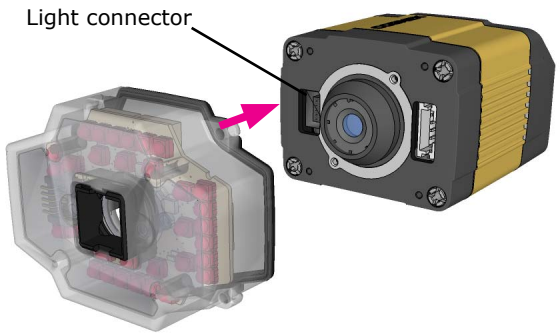

4 Attach C-Mount cover base.

Installing the Lens (Continued)

5 Add screws to C-mount cover base.

Align the peg on the reader and the slot on the cover so that the cover locks in place.

⚠ Tighten in sequence. Torque limit: 9 N-cm (0.8 Lb-In).

1		3
4		2
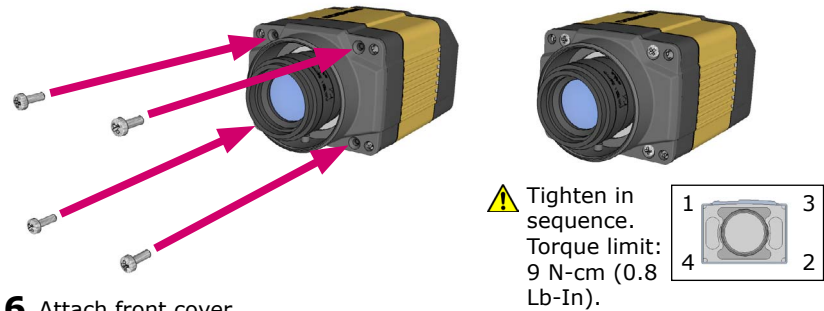
6 Attach front cover.
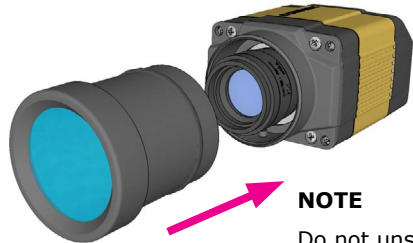
NOTE

Do not unscrew the front-most part of the nose of the cover to avoid risking the glass lens falling out.
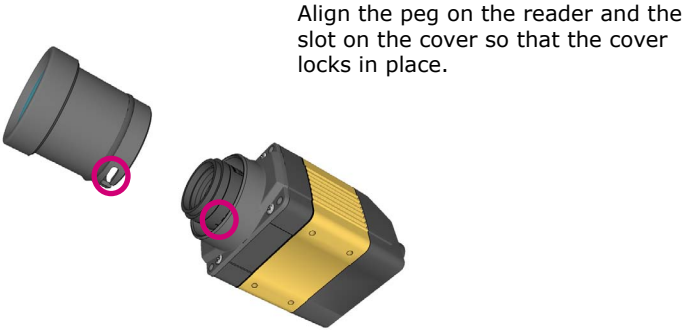
External Light Mounting Brackets

You can mount your reader using external light mounting brackets. The brackets are intended to mount any of the different lights to the reader. They can also be used to mount the reader (with lights attached) to your machine. Pivot mounting, as illustrated, is optional. Perform the following steps:

1. Mount your reader on the camera plate and attach the screws.
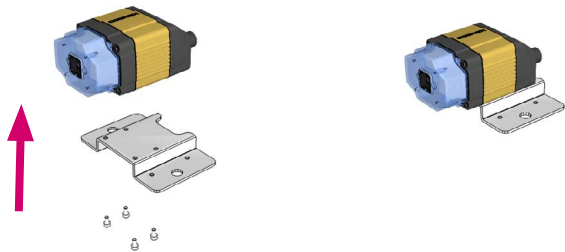
2. Mount your reader with the camera plate attached to any of the external light bracket adapters.
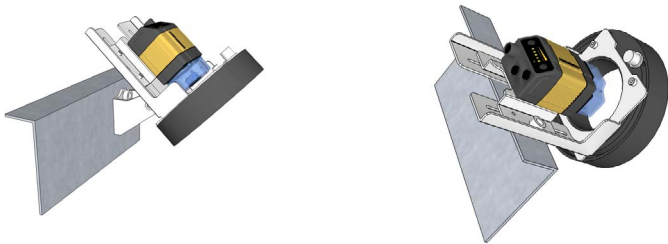
Choose one of the following light options:

- Using coaxial (DOAL) light
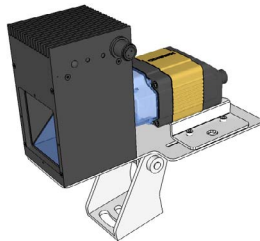
- Using ring light
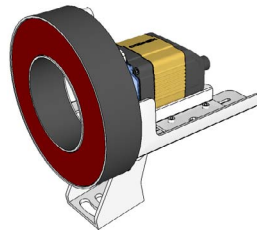
- Using dark field light
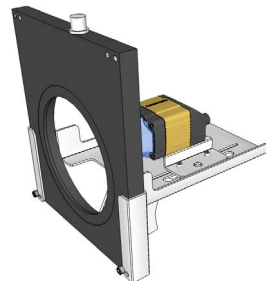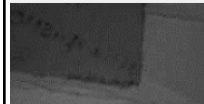
- Using spot light
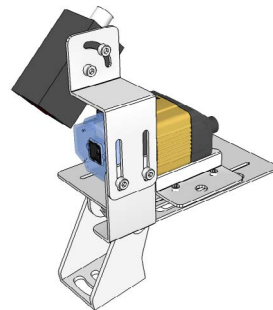
Setting Focus

There is a range of reading distances available for different code sizes and focus positions. To set focus on your reader, use the following options depending on whether you use a liquid lens or a manual focus lens.

Liquid Lens	Manual Focus Lens
Focus Feedback (Results Display) 	Focus Feedback (Results Display)
Optimize Focus (Focus Settings) 	
Focus Sweep (Focus Settings) 	

For setting **Focus Sweep**, follow these guidelines:

- If your application has a consistent reading range, set the focus range to a limited depth of field with no steps (for example, set it to 20) or with limited steps (for example, set it to 2 steps between 0 and 30). This way you can achieve fast performance.
- If your application has a variety of code types and sizes, set the focus range to a wider depth of field with increased number of steps (for example, set it to 6 steps between 0 and 200). This way you can get better coverage.

Both **Optimize Focus** and the **Focus Feedback** use the same procedure for testing the current focus. They consider various subregions of the image.

For maximizing the performance of Optimize Focus and Focus Feedback, observe the following:

- Use a focus target (such as the one supplied with this Quick Reference Guide) that includes high-contrast features and is big enough that it fills at least a 100x100 pixel region in the center of the field of view at the desired working distance.
- Make sure the target is perfectly flat (avoid floppy pieces of paper).
- Make sure that the target is perfectly perpendicular to the optical axis of the reader.
- Make sure that the rest of the field of view (such as the part not covered by the focus target) does not contain any high-contrast features. For example, you would ideally fill the entire field of view with a white card or sheet of paper (no shadows), then position the focus target in the middle.

Setting Focus (Continued)

- The supplied focus target (120x120mm) is appropriate for typical working distances. If you are using a working distance such that the target does not completely fill the image, make sure that there are no high-contrast features visible outside of the target (see previous bullet).

Perform the following steps to use **Focus Feedback**:

1. Connect the reader to the Setup Tool.

2. On the Results Display pane, check the Focus Feedback option and enable Live Display.

3. The Focus Feedback column is displayed in colors ranging from red (bad focus) through yellow to green (sharp focus).

Position the reader in a way that the focus column becomes green. The maximum focus peak gets locked for better orientation. When the focus column is green, the lens is in focus and you will be able to decode the image.

Field of View and Reading Distances

The following maps show the field of view of the DataMan 300 and the DataMan 302 readers. Reading distance values are also provided for 1-D and 2-D example code distances.

For the C-mount (or other non-Cognex) S-Mount lenses, the lens's focal length, focus setting, and aperture setting determine the field of view and reading distance.

Reading Distance and Field of View (DataMan 300 Series Readers with a 10.3 mm Lens)

This map shows the field of view of the DataMan 300 and the DataMan 302 readers with a 10.3 mm lens (with or without a liquid lens).

The upper values show the field of view of the DataMan 302 reader, while the bottom values show the field of view of the DataMan 300 reader.

396 mm (15.5 in)

312 mm (12.2 in)

247.5 mm (9.7 in)

195 mm (7.6 in)

154 mm (6.06 in)

96.2 mm (3.7 in)

33 mm (1.29 in)
20.6 mm (0.81 in)

2-D
- 5 mil 75 mm (2.9 in)
- 10 mil 210 mm (8.2 in)
- 20 mil 374 mm (14.7 in)

1-D
- 7 mil 215 mm (8.4 in)
- 13 mil 409 mm (16.1 in)
- 18 mil 500 mm (19.6 in)

mm 0   100   200   300   400   500   600

in 0   3   6   9   **12**   15   18   21   **24**

200   6   100   3   0   3   100   6   200   mm   in
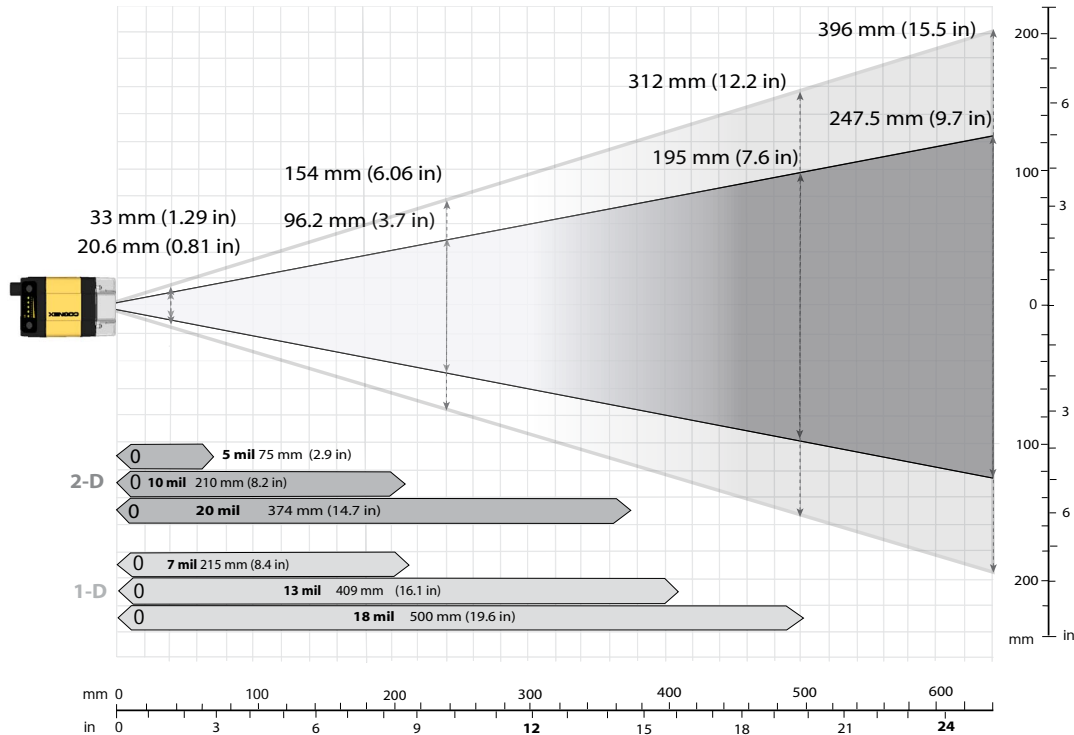
Reading Distance and Field of View (DataMan 300 Series Readers with a 16 mm Lens)

This map shows the field of view of the DataMan 300 and the DataMan 302 readers with a 16 mm lens.

The upper values show the field of view of the DataMan 302 reader, while the bottom values show the field of view of the DataMan 300 reader.

245 mm (15.3 in)

153 mm (6.02 in)

125 mm (4.9 in)

78 mm (3.07 in)

45 mm (1.7 in)
28 mm (1.1 in)

2-D

2 mil 59 mm -72 mm (2.8 in)

4 mil 55 mm - 207 mm (8.1 in)

8 mil 49 mm - 295 mm (11.6 in)

1-D

2 mil 60 mm - 125 mm (4.9 in)

4 mil 55 mm -270 mm (10.6 in)

6 mil 56 mm - 400 mm (15.7 in)

mm	0	100	200	300	400	500	600
in	0	3	6	9	12	15	18	21	24
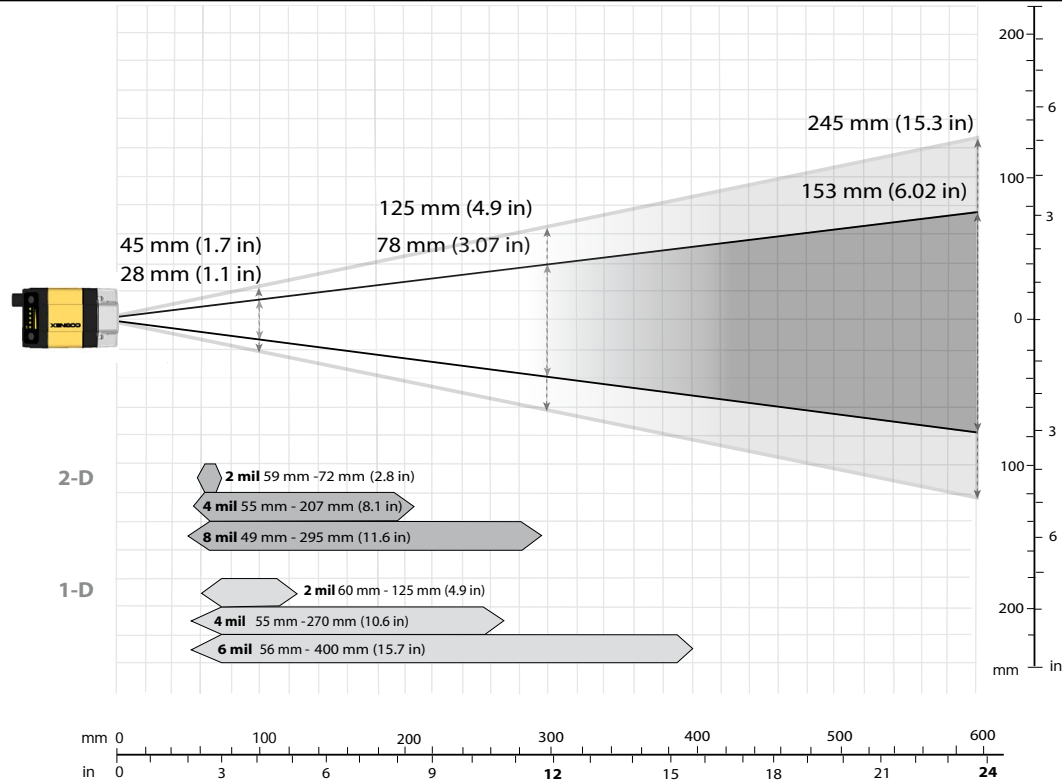
Dimensions

Observe the following DataMan 300 series reader dimensions when installing your reader.

M3-5 (4x) mounting holes for the device

54

9

83

20

37

64

22 30
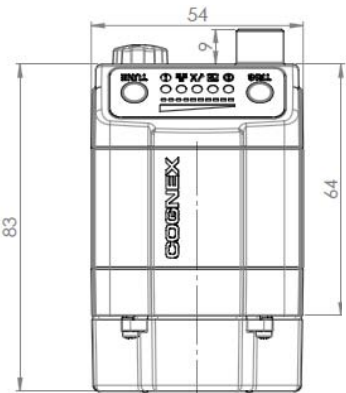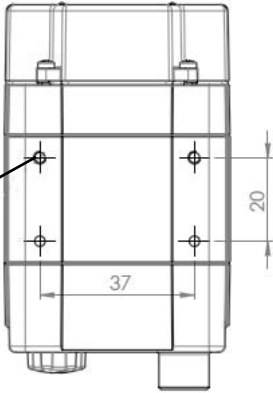
S-Mount (M12) Lens version

COGNEX
TUNE
TRIG
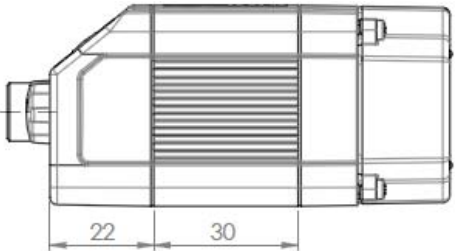
M3-6 (4x) mounting holes for external illumination

32

44

42

8,5

15,3 15,3

LEDs

operating buttons

TRIG

TUNE
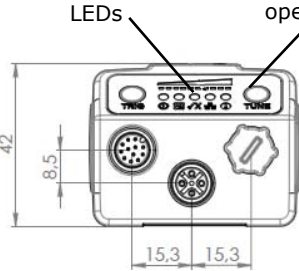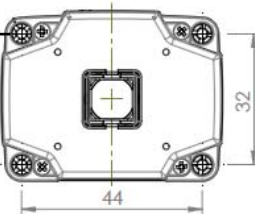
C-Mount Lens version

Ø 40

48

112

DataMan 300 Series Imager Specifications

Specification	DataMan 300 Series Imager
Image Sensor	1/1.8 inch CMOS
Image Sensor Properties	6.9 mm x 5.5 mm (H x V), 5.3 µm square pixels
Image Resolution (pixels)	• DataMan 300: 800 x 600 • DataMan 302: 1280 x 1024
Electronic Shutter Speed	5 µs minimum exposure, 5 µm maximum exposure
Image Acquisition	up to 60 fps at full resolution
Lens Type	• S-Mount 10.3 mm F:5 (with optional liquid lens) • S-Mount 16 mm F:9 • C-Mount lenses (with limitations, see below)

Limitations to C-Mount lenses:

- The length of the thread may not exceed 5.4 mm.
- The back side of the lens may not exceed beyond the C-Mount threads. Possibly a lens spacer is required.
- When using the C-Mount lens cover, lens dimensions including spacer and filters may not exceed 32 x 42 mm (diameter x length).

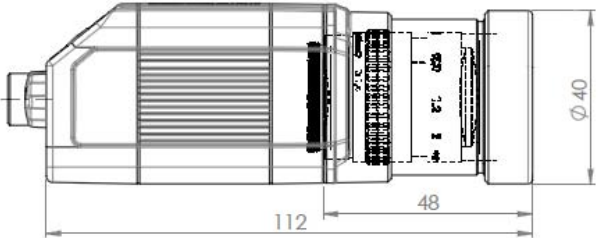To avoid accelerated aging of built-in illumination LEDs, which results in light intensity degradation, consider the following duty cycle limits above 25°C (77°F):

- at 35°C (95°F): 4% duty cycle, for example, 750 µs exposure and 18493 µs interval
- at 45°C (113°F): 2% duty cycle, for example, 350 µs exposure and 18093 µs interval or 1000 µs exposure and 50000 µs interval

Installing DataMan Software and Connecting the Reader

INSTALL DATAMAN SOFTWARE AND CONNECT

1. Check the DataMan Release Notes for a full list of system requirements.

2. Insert CD-ROM and follow the on-screen prompts until you successfully completed the DataMan Software installation process.

3. Connect the DataMan 300 Series reader to your PC.

4. Launch the Setup Tool and click **Refresh**.

   Detected readers will appear under **COM ports** or **Network devices**, or both.

5. Select a reader from the list and click **Connect**.

> ⚠ Do not stare into beam when adding, removing, or changing cables. Cognex recommends to unpower the reader any time you make physical changes to it.

CONNECT YOUR READER

1. Connect the I/O+RS232+24V cable to your reader.

2. For a network connection, connect your reader, through an Ethernet cable, to your network.

3. Connect the cable to a 24V power supply.

Start the Setup Tool

Connect the reader to the Setup Tool to configure it with the type of symbologies it will decode as well as other parameters, such as the type of trigger it will use and the format of the results it will generate.

Alternatively, configure your reader by scanning the appropriate reader configuration code from the *Reader Configuration Codes* document, available through the Windows Start menu.

Quick Setup

All main controls and visual feedback in a single view, for easiest setup and configuration

Connect to Reader

Establish a connection to the reader

Results Display

View results

Light and Imager Settings

Choose a trigger type and other acquisition parameters

System Settings

Configure visual and audio feedback, trigger and output actions

Table View

See all the selectable values in the Setup Tool in one table

Trigger button, IN1 button, Tune button, Latest image, Region of interest, Context based help, Read history, Code information, Train status, Connection status

Use the Setup Tool Menu Bar

The In1 button on the toolbar creates a virtual rising edge signal on Input 1. Use the In1 button to activate various actions such as training a code, optimizing brightness or setting a match string without a physical input 1 channel.

Each reader can store its current set of runtime parameters to a configuration (.cfg) file, which contains information such as the enabled symbologies and how any output data should be formatted.

The same configuration file can be loaded onto multiple readers, as the file does not contain identification information such as the IP address or device name of the reader used to create it.

A reader can also generate a Cognex device configuration (.cdc) file, which stores the set of runtime parameters plus any identification data, such as the name of the device, its IP address, subnet mask, and so on. Cognex recommends generating a device configuration file for each reader to allow you to restore a reader to its operating state with minimal effort.

Use the **File** menu of the Setup Tool to manage .cfg and .cdc files:

File Menu	
Open Configuration	Open a saved .cfg configuration file.
Save Configuration	Create a .cfg configuration file of current runtime parameters.
Print Configuration Code	Generate a programming codes sheet representing your reader's .cfg configuration.
Restore Device	Load a saved device configuration .cdc file, with run-time parameters plus device-specific information for a particular DataMan 300 series reader.
Backup Device	Create a device configuration .cdc file for a specific reader.
Print Device Backup Code	Generate a programming codes sheet representing your reader's .cdc configuration.

Export Parameters	Save (all or only the non-default) parameters of your device in a text file.
Load Image	Load an 8-bit uncompressed grey-scale .bmp or .jpg image for analysis.
Save Image	Save the latest acquired image with the .jpg or .bmp file format.
Save Burst Images	Save the latest batch of burst images.

Use the **Edit** menu for standard Cut, Copy and Paste operations.

Use the **View** menu to view reader information (serial number, firmware version, and so on) and to enable and disable various elements of the Setup Tool, and the **Tasks** menu to switch between various Setup Tool options.

Use the **System** menu to manage the current settings on the reader and to upgrade the features it currently supports:

System Menu	
Save Settings	Save the current parameters to non-volatile memory, which allows the reader to restore these settings each time you reboot it.
Reset Configuration	Reset all configuration parameters in RAM (volatile memory) to the default settings.
Update Firmware	Update the reader software.
Upload Feature Key	Unlock additional features available in the reader software if you have the right key.
Show Device Log	Error and exception conditions, such as missed triggers and trigger overruns are logged.
Delete Device Log	Clear your device log.

Use the **Help** menu to display Setup Tool version information.

Troubleshooting an Ethernet Connection

Based on your network configuration, the Setup Tool may not be able to communicate with the reader and it will not appear in the list of **Network devices**.

First check your Ethernet connection with the reader and click **Refresh** in the Setup Tool. Next, scan the **Enable DHCP** code in the *Reader Configuration Codes* document available from the Start menu. This might allow the reader to acquire a suitable IP address from a DHCP server on your subnet.

If the reader still does not appear, you can use either the **Add Device** or **Force Network Settings** options in the Setup Tool.

If you know the IP address of the reader, use the **Add Device** option. If you do not know the IP address, use the **Force Network Settings** options. Either method should allow the DataMan 300 series reader to appear in the list of **Network devices** so that you can connect to it through the Setup Tool and your Ethernet connection.

You can also use the RS-232 connection to configure the reader with parameters that allow it to communicate over your Ethernet network.

Industrial Protocols

The DataMan 300 series readers support the following industrial protocols:

- EtherNet/IP™
- PROFINET
- MC Protocol
- Modbus TCP

Select industrial protocol samples and tools you want to use when you install the DataMan Software.
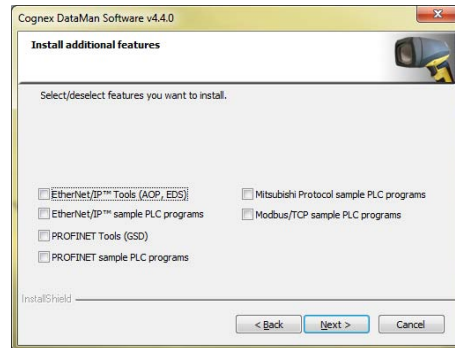
There are three ways to enable or disable Industrial Protocols. Using either method, a reboot is required for the changes to come into effect.

- Enable the protocols using the **Industrial Protocols** pane of the Setup Tool (under Communication Settings).
- Scan the appropriate **Reader Configuration codes** (see *Reader Configuration Codes* available through the Windows Start menu).
- Send the appropriate **DMCC** (see *Command Reference* available through the Windows Start menu).

For more information on using the industrial protocols, read the *DataMan Communications and Programming Guide* available through the Windows Start menu.
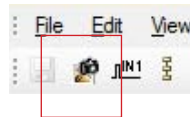
DataMan 300 Series Triggering

DataMan 300 series readers support the following trigger modes:

- Self: At an interval you configure, the reader automatically detects and decodes codes in its field of view. If you set a higher re-read delay than the trigger interval, there is a code output only once until the code is out of the field of view for the duration of the re-read delay.
- Single (external trigger): Acquires a single image and attempts to decode any symbol it contains, or more than one symbol in cases where multicode is enabled. The reader relies on an external trigger source.
- Presentation: Scans, decodes and reports a single code in the field of view. The reader relies on an internal timing mechanism to acquire images.
- Manual: Begins acquiring images when you press the trigger button on the reader, and continues acquiring images until a symbol is found and decoded or you release the button.
- Burst: Performs multiple image acquisitions based on an external trigger and decodes any symbol appearing in a single image or within a sequence of images, or multiple symbols in a single image or within a sequence of images when multicode is enabled. You can control the number of images within each burst and the interval between image acquisitions.
- Continuous: Begins acquiring images based on a single external trigger and continues to acquire and decode images until a symbol is found and decoded, or until multiple images containing as many codes as specified in multicode mode are located, or until the trigger is released. You can configure your reader to acquire images based on the start and stop signal from separate digital IO pulses.

External Triggers

If you are using external triggering you can use any of these methods to trigger your DataMan 300 series reader:

- Press the trigger button on the reader.
- Send a pulse on the I/O cable:
  - Trigger + (red)
  - Trigger - (black)
- Send a serial trigger command over the RS-232 connection or Ethernet connection.
- Press <CTRL>-T on the keyboard while the Setup Tool has the input focus.
- Click the Trigger button in the Setup Tool:

DataMan 300 Series Tuning

By tuning, your DataMan 300 series reader automatically selects the best settings for the given reading situation, based on parameters of illumination, camera and decoder properties, and focal distance. Use this feature to create an optimum setting to read your 1-D or 2-D codes.

You can use any of the following methods to tune your reader:

- Press the Tune button at least for 3 seconds on your reader. The first press starts the tuning, and the second press cancels the tuning, if it is still ongoing.

- Turn on tuning in the Setup Tool.
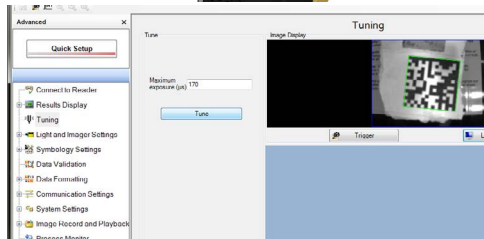
- Start tuning by sending a DMCC, for more information, see the *Command Reference*, available through the Windows Start menu.

- Use Input line 1 for tuning. Go to the Setup Tool's **System Settings** pane and check **Tune**. You can also use the In1 button on the toolbar.

DataMan 300 Series Image Filtering

You can define a stack of filters to be applied to each image acquired by your DataMan 300 series reader. You can select the following filters on the Setup Tool's **Image Filtering** pane (under Light and Imager Settings):

- *Equalize*
This filter redistributes the brightness values of the pixels in the image. As a result, the range of brightness levels are more evenly represented. Use this filter if you have too dark or too bright images.

- *Stretch*
This filter linearly scales up or stretches the greyscale values in the input image to the full 256-step greyscale. The result is an output image with increased contrast.

- *Low Pass*
Using this filter results in output images where edges are smoothed or blurred.

- *Dilate*
This filter increases bright features and shrinks dark features. The result is an output image with larger areas of bright pixels. Use this filter to remove dark specks.

- *Erode*
This filter shrinks bright features and increases dark features. The result is an output image with larger areas of dark pixels. Use this filter to remove light specks.

- *Open*
This filter performs an erosion followed by a dilation to filter out bright features that are smaller than the size of the processing neighborhood. The result is an output image with slightly decreased overall brightness.

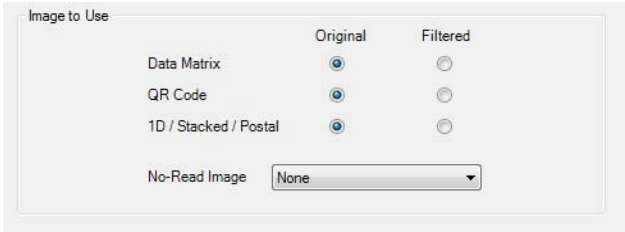# DataMan 300 Series Image Filtering (Continued)

- *Close*

This filter performs a dilation followed by an erosion to filter out dark features that are smaller than the size of the processing neighborhood. The result is an output image with slightly increased overall brightness.

- *Auto Stretch*

This filter reduces the pixel value range. It maps the pixel values from 0 to 255.

- *Optical Density*

This filter specifies an inversion of pixel values based on a logarithmic scale. The result is an output image that reveals the density of objects and features in the input image by measuring the amount of light that passes through them. Denser objects and features are represented by lighter pixels in the output image.

- *Invert*

This filter specifies an inversion of pixel values based on the 256-step greyscale. The result is an output image that is a "negative" of the input image.

To use Image Filtering, perform the following steps:

1. On the Image Filtering pane, click **Add**.

2. Select a filter from the **Filter Properties** drop-down box. You can add more than one filter. You can also specify the order in which filtering is done by moving the filters using the **Up** and **Down** buttons.

3. If the filter you selected require further settings, change properties according to your needs.
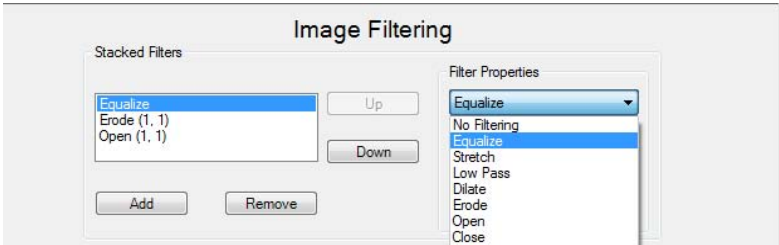
4. Change the selection in the **Image to Use** group box according to the symbology you want to be filtered (after making sure that that Symbology is enabled):


If no image is read, the Results Display shows the image according to your selection under No-Read Image.

DataMan 300 Series Image Filtering (Continued)

5. Go to the **Displayed Image Settings** pane and change the Images to Use according to what you want to see on Live Display: the original or the filtered image.

6. You can compare the original and filtered results on the **Results Display** if you choose the images from the **Read Result History**.
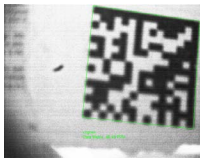

The example images were taken using the Equalize filter.

Training the Reader

Training your reader with the expected symbology can make the time required to decode successive symbols more consistent. In addition, training may help increase decode yield.

To train your reader, place a code in front of the reader and do one of the following:

- Press and hold the trigger button for a minimum of 3 seconds.

- Click and hold the trigger button in the Setup Tool for a minimum of 3 seconds.

- Click **Train Code** in the Results Display pane.
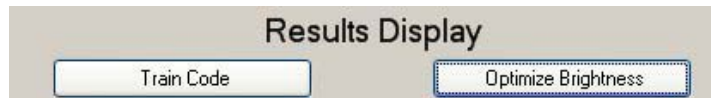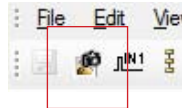
You can use training in Single, Burst, Continuous or Self trigger modes.

NOTE that only a single symbol of each symbology kind can be trained.

Training the Reader (Continued)

Training Feedback

The second LED from left on the reader glows green to indicate that it is currently trained, or yellow to indicate that it is not trained.

Connect the reader to the Setup Tool to untrain it and allow it to recognize other enabled symbologies.

### Incremental Training for Multiple Symbologies

If you want to train the reader to recognize multiple symbologies, you can present a single image showing all the desired symbologies and perform the training procedure previously described.

If you cannot present a single image showing all the necessary symbologies, you can enable incremental training on the **Training** tab of the **Symbology Settings** pane:
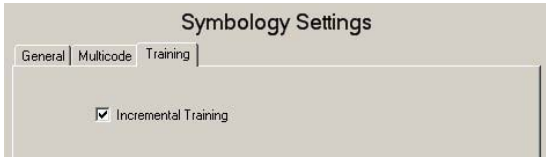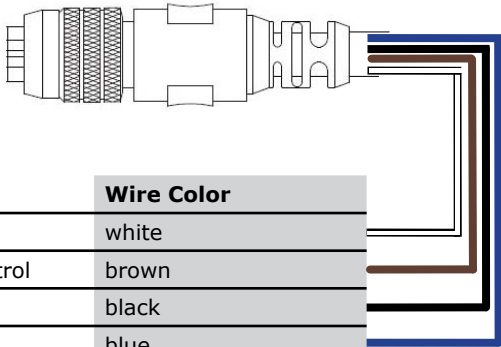

With incremental training enabled, you can train the reader using multiple images showing the symbologies you expect to decode. The reader will train each new symbology while retaining the existing trained symbologies.
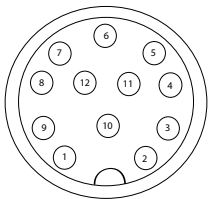
External Light Control
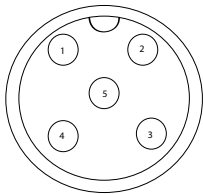
A 4-pin cable is provided for the external light control.

The above drawing shows the **socket** on the device.
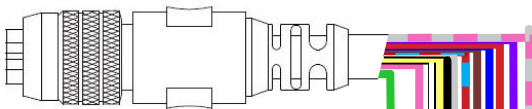
Pin #	Signal Name	Wire Color
1	Vout24	white
2	Brightness Control	brown
3	VoutRTN	black
4	Strobe	blue
5	Chassis	not connected

I/O Cable

The above drawing shows the **plug** on the device.

The I/O cable provides access to trigger and high-speed outputs. Unused wires can be clipped short or tied back using a tie made of non-conductive material.

Pin #	Signal Name	Wire Color
1	Out 2	White
2	TxD	Green
3	RxD	Pink
4	Out 3	Yellow
5	In 1	Grey
6	Common In	Black
7	Vin24	Brown
8	Vrtn	Blue
9	Common Out	Purple
10	In 0	Red
11	Out 0	Grey/Pink
12	Out 1	Red/Blue

Acquisition Triggering

The acquisition trigger input on the reader is opto-isolated. To trigger from an NPN (pull-down) type photo-detector or PLC output, connect **Common In** to +24V and connect **In** to the output of the detector. When the output turns on, it pulls **In** down to 0V, turning the opto-coupler on.

To trigger from an PNP (pull-up) photo-detector or PLC output, connect **In 0** to the output of the detector and connect **Common In** to 0V. When the output turns on, it pulls **In 0** up to 24V, turning the opto-coupler ON.
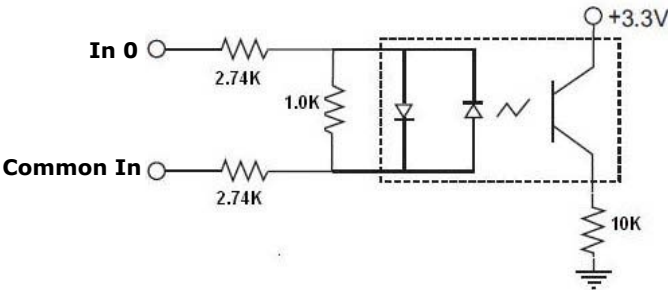

26.4V Max. Across input pins - Transition approx. 12V (Min).

High-Speed Output Lines

The high-speed outputs can be used as either NPN (pull-down) or PNP (pull-up) lines. For NPN lines, the external load should be connected between the output and the positive supply voltage (<26.4V). The outputs pull down to less than 3V when ON, which causes current to flow through the load. When the outputs are OFF, no current flows through the load.
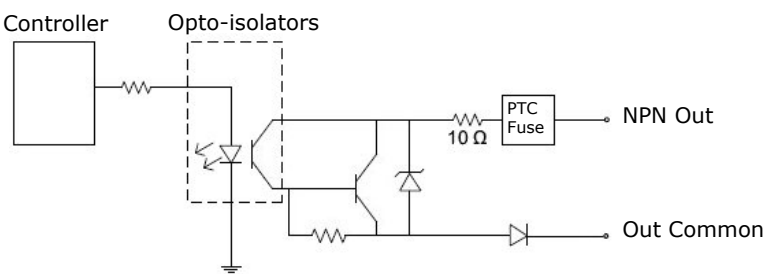
For PNP lines, the external load should be connected between the output and the negative supply voltage (0V). When connected to a 24VDC power supply, the outputs pull up greater than 21V when ON, and current flows through the load. When the outputs are OFF, no current flows through the load.
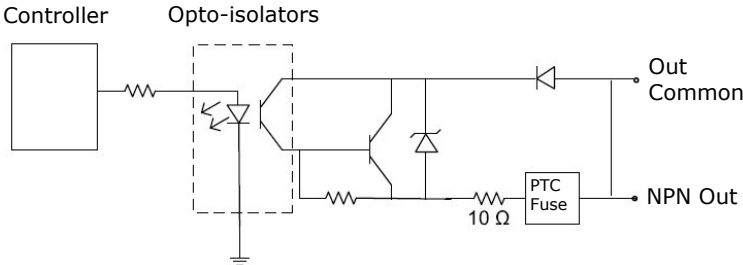
Specification	Description
Voltage	26.4V maximum through external load
Current	50mA maximum sink current
	OFF state leakage current 100µA
	External load resistance 240 Ohms to 10K Ohms
	Each line rated at a maximum 50mA, protected against over-current, short circuits and transients from switching inductive loads. High current inductive loads require external protection diode.

High Speed Output Wiring

To connect to an NPN-compatible PLC input, connect Output 0, Output 1, Output 2, or Output 3 directly to the PLC input. When enabled, the output pulls the PLC input down to less than 3V.

Common — High Speed Out 0

GND (pin 8)
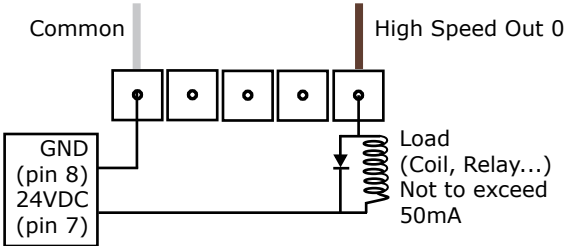24VDC (pin 7)

NPN PLC
NPN Compatible Input
GND
24VDC
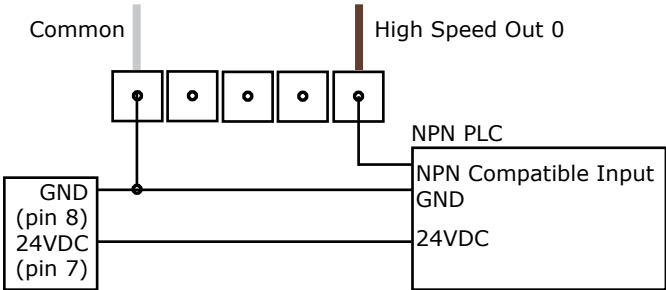
To connect to a PNP-compatible PLC input, connect Output 0, Output 1, Output 2 or Output 3 directly to the PLC input. When enabled, the output pulls the PLC input up to greater than 21V.

Common — High Speed Out 0

GND (pin 8)
24VDC (pin 7)

PNP PLC
PNP Compatible Input
GND
24VDC
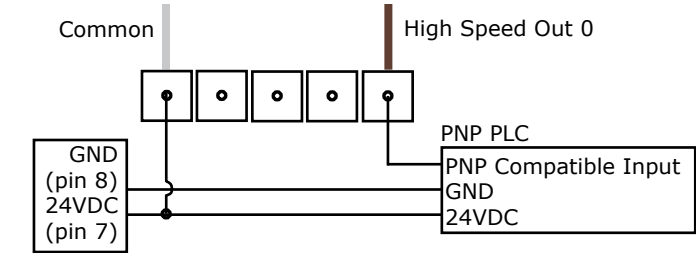
To connect the high-speed outputs to a relay, LED or similar load, connect the negative side of the load to the output and the positive side to +24V. When the output switches on, the negative side of the load is pulled down to less than 3V, and 24 appears across the load. Use a protection diode for a large inductive load, with the anode connected to the output and the cathode connected to +24V.

Common — High Speed Out 0

GND (pin 8)
24VDC (pin 7)

Load (Coil, Relay...) Not to exceed 50mA

DataMan 300 Series Specifications

Weight	165 g	
Operating Temperature	0ºC — 45ºC (32ºF — 113ºF)	
Storage Temperature	-10ºC — 60ºC (-14ºF — 140ºF)	
Maximum Humidity	95% (non-condensing)	
Environmental	IP65 (with cable or protection cap attached to all connectors, front cover properly installed)	
Vibration	EN61373 including IEC 60068-2-6,60068-2-64 6.4, and 60068-2-27	
RS-232	RxD, TxD according to TIA/EIA-232-F	
Codes	Data Matrix™ (IDMax: ECC 0, 50, 80, 100, 140, and 200; IDQuick: ECC200) QR Code and microQR Code UPC/EAN/JAN Codabar, Interleaved 2 of 5, Code 39, Code 128, and Code 93, Pharma, Postal, RSS/CS, PDF 417, MicroPDF 417	
Discrete I/O operating limits	Trigger, HS Output 0,1,2,3	Max output current: 50 mA @ 26.4 VDC
		Output load: 470 Ω @ 24 VDC; 150 Ω @ 12 VDC
		Input voltage limits:- 28 VDC — +28 VDC
		Input current: 4.2 mA @ 24 VDC; 2.0 mA @ 12 VDC
Power Supply Requirements	24V	Maximum power: 5W (internal illumination) 18W (internal + external lights)

Warnings and Notices

NOTE: For product support, contact http://support.cognex.com

CAUTION: IP protection is ensured only when all connectors are attached to cables or shielded by a sealing cap.

LASER LIGHT, DO NOT STARE INTO BEAM: CLASS 2 LASER PRODUCT

FAILURE TO FOLLOW THESE INSTRUCTIONS MAY CAUSE SERIOUS INJURY

- CAUTION - Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
- Do not attempt to service or repair this product -- return it to Cognex for service.
- Do not permit anyone other than Cognex Corporation to service, repair, or adjust this product.
- Do not attempt to open or modify this device except as described in this document.
- Do not direct or reflect laser light toward people or reflective objects.
- Do not operate this device if it is damaged or if the covers or seals are missing or damaged.

This Laser Product is designated as Class 2 during all procedures of operation.

Wavelength	650 nm
Laser Power for classification	< 1 mW
Beam Diameter	< 3mm at aperture
Divergence	< 1.5 mrad

Compliance Statements

DataMan 300 series readers meet or exceed the requirements of all applicable standards organizations for safe operation. However, as with any electrical equipment, the best way to ensure safe operation is to operate them according to the agency guidelines that follow. Please read these guidelines carefully before using your device.

Regulator	Specification
USA	FCC Part 15, Class A FDA/CDRH Laser Notice No 50
Canada	ICES-003
European Community	EN55022:2006 +A1:2007, Class A
	EN55024:1998 +A1:2001 +A2: 2003
	EN60950
	EN60825-1
Australia	C-TICK, AS/NZS CISPR 22 / EN 55022 for Class A Equipment
Japan	J55022, Class A

FCC Class A Compliance Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Canadian Compliance

This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

C-Tick Statement

Conforms to AS/NZS CISPR 22/ EN 55022 for Class A Equipment.

European Compliance

The CE mark on the product indicates that the system has been tested to and conforms to the provisions noted within the 2004/108/EEC Electromagnetic Compatibility Directive and the 2006/95/EEC Low Voltage Directive.

For further information please contact:
Cognex Corporation
One Vision Drive
Natick, MA 01760
USA

Cognex Corporation shall not be liable for use of our product with equipment (i.e., power supplies, personal computers, etc.) that is not CE marked and does not comply with the Low Voltage Directive.

Laser Safety Statement

Compliance with FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.

This device has been tested in accordance with IEC60825-1 2nd ed., and has been certified to be under the limits of a Class 2 Laser device.

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

LASER LIGHT - DO NOT STARE INTO BEAM
CLASS 2 LASER PRODUCT 650nm <1mW
CLASSIFIED PER IEC 60825-1, Ed 2, 2007-03
CLASSIFIED PER AU/NZS 2211.1 : 2004

UL and cUL Statement (Pending)

UL and cUL listed: UL60950-1 2nd ed. and CSA C22.2 No.60950-1 2nd ed.

For European Community Users

Cognex complies with Directive 2002/96/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on waste electrical and electronic equipment (WEEE).

This product has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment, if not properly disposed.

In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems for product disposal. Those systems will reuse or recycle most of the materials of the product you are disposing in a sound way.

The crossed out wheeled bin symbol informs you that the product should not be disposed of along with municipal waste and invites you

Compliance Statements (Continued)

to use the appropriate separate take-back systems for product disposal.

If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You may also contact your supplier for more information on the environmental performance of this product.

Reader Control Codes

Reset Scanner to
Factory Defaults

Reboot Scanner

P/N 590-7136